Non-Profit Institute Option

ISS Research Institute

September 12, 2002

ISS Research Institute (ISSRI) Option
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ISS Research Institute (ISSRI) Option

End-State Description

In its end state, the Institute is envisioned as follows:

- The Institute, contracted to a non-profit organization and managed within the NASA infrastructure, is devoted to research, the utilization of the ISS for science, technology, and commercial purposes, and the provision of services to the user community and the public.
- The Institute facilitates the scientific and industrial communities' access to the ISS.
- The Institute plays a pivotal role in S/T/C leadership, representing and advocating for the entire user community and serving as the ISS interface knowledgeable expert for the users.
- The Institute is responsible for Guest Investigator (GI) Programs, managing investigations which use existing flight hardware systems
- The Institute may develop and sustain a certain level of new and/or existing flight equipment and its associated ground systems, on a case-by-case basis as determined by NASA, in order to better understand and represent the users' needs and issues.

ISS Research Institute (ISSRI) Option
Rationale

- It is appropriate to use an Institute when:
  - NASA seeks to achieve an enhanced collaboration with the broader research community
- Advantages for using an Institute are:
  - The Institute can provide the intellectual leadership role and form the central focus of the science and research program conducted at the Institute for the ISS

ISS Research Institute (ISSRI) Option
Guest Investigator Concept

- A Guest Investigator (GI) is defined as an Investigator who proposes to use an existing piece of hardware with limited or no modifications. This would include, but not be limited to, sub-rack level, multi-user “mini-facilities”.
- As such, a GI would respond to an NRA that solicits investigations for existing hardware built for ISS Utilization.
- The ISSRI will accept responsibility for those existing pieces of hardware and release an ISSRI announcement identifying the research capabilities of these hardware units.
- The ISSRI will then be responsible for developing the necessary upgrades to the hardware required to meet the full set of requirements for a specific GI.
- The equivalent example would be the “mini-facilities” presently being built for several of the Research Programs such as the Multi-user Droplet Combustion Apparatus (MDCA) for the Combustion Program and the Light Microscopy Module (LMM) for the Fluid Physics program. These “mini-facilities” are being designed for multiple present and future users and will be fixtures in future NRA’s.
- In this concept the ISSRI will take over sustaining and maintaining responsibility for these units and be responsible for identifying future users (GI’s) for them.

ISS Research Institute (ISSRI) Option
End-State Functional Allocation

Science/Technology/Commercial Leadership	ISSRI Lead	ISSRI Support	GI Programs	Remarks
1) Management of Research Utilization				
a) Establish Research Plans		Full Support		NASA leads
b) Manage Research Programs			Lead	NASA leads for non-GI
c) Manage Integrated Research Utilization	Increment Schedules	Program Boards		NASA leads
2) Preparing and Allocating Budgets				
a) Budget Formulation, Justification		Support as needed		NASA leads
b) Budget Execution		Support as needed		NASA leads
3) Selecting and Prioritizing Research				
a) Managing selection process	ISS specific PIs	All others	Lead	Others includes: international, non-ISS
b) Selection		All others	Lead	specific PIs, technology, commercial
c) Prioritizing selections		All others	Lead	
5) Developing Cost, Schedule, and Risk Assessments				
a) Perform Cost, Schedule, Risk Management Assessment		Full Support	Lead	NASA leads non-GI
b) Authority to Proceed		Full Support		NASA leads
13) Managing Missions and Allocating Services				
a) Advocacy, Manifesting and Resource Allocations	Lead			
b) ISS Research Mission Management				NASA leads
18. Educating and Reaching Out to the Public (including industry)				
a) Management and Control	Lead			Direction and approval of strategy and
b) Disseminate, Communicate & Report results to ISS customers	Lead			products provided by NASA
19. Recommending ISS Pre-Planned Product Improvements	Lead			For payload systems input to P3I
20. Managing Archival of Research Samples, Data, and Results	Lead			

ISS Research Institute (ISSRI) Option
End-State Functional Allocation

Sustaining Payloads	ISSRI Lead	ISSRI Support	GI Programs	Remarks
7) Maintaining and Sustaining Flight Research Systems				All other payloads managed by NASA, International Partners, other agencies, or commercial owners
a) DDT&E	for ISSRI dev and/or managed Flight systems			
b) Operations	for ISSRI dev and/or managed Flight systems			
9) Maintaining and Sustaining Ground Systems				Other ground systems managed by NASA, International Partners, other agencies, or commercial owners
a) Identify changes/upgrades to Research Flight Systems	For Grnd Sys assoc. with ISSRI dev. and/or managed Flight systems			
b) Maintain & Sustain Research Ground Systems	For Grnd Sys assoc. with ISSRI dev. and/or managed Flight systems			

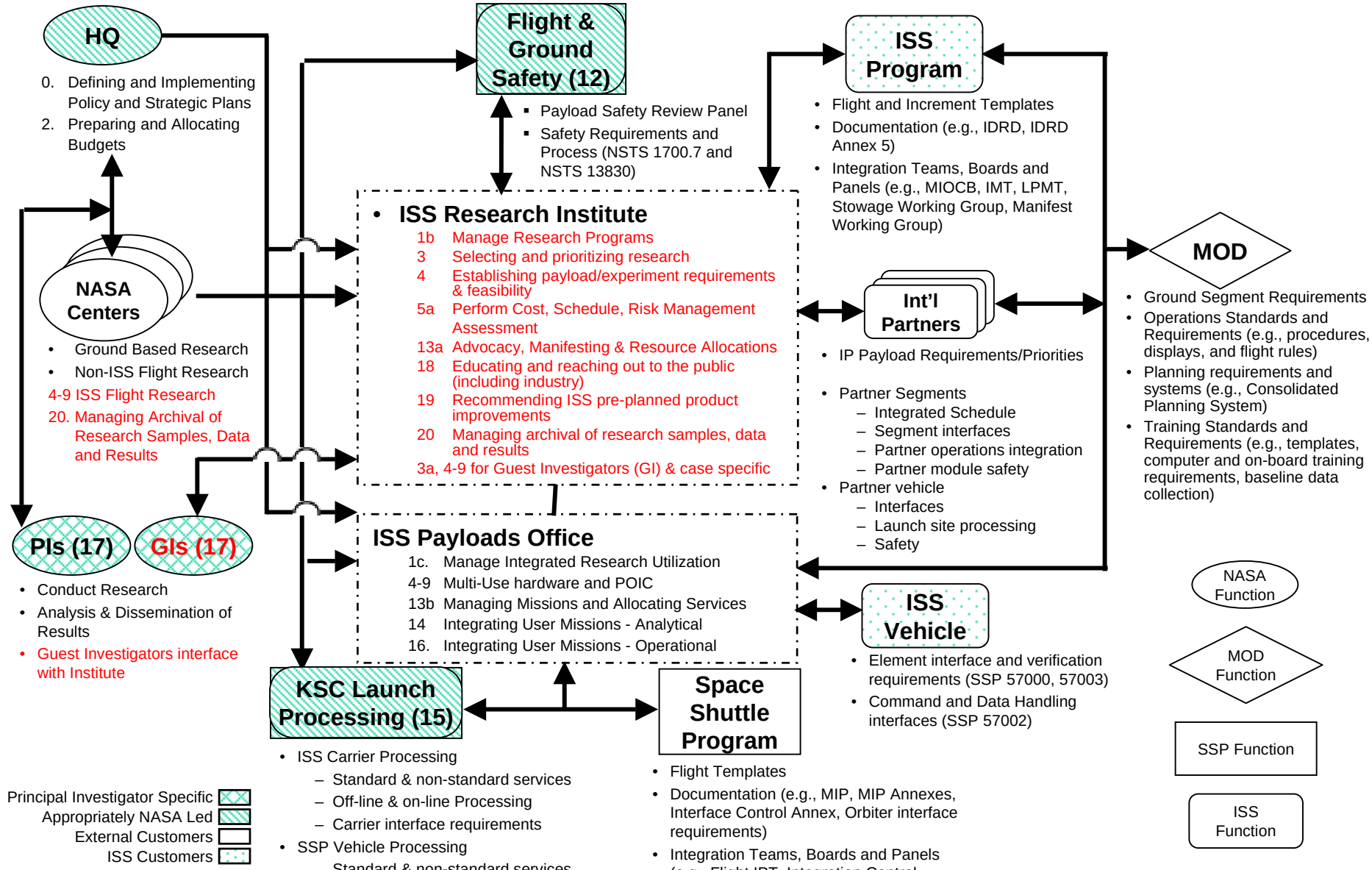
ISS Research Institute (ISSRI) Option
End-State Functional Allocation

Developing Payloads	ISSRI Lead	ISSRI Support	GI Programs	Remarks
4) Establishing Payload/Experiment Requirements and Feasibility				For other payloads managed by NASA, International Partners, other agencies, or commercial owners
a) Research Requirements	Payloads desgnated by NASA		Lead	
b) Engineering Concept Development & Hardware Assessments	Payloads desgnated by NASA		Lead	
6) Developing and Qualifying Flight Research Systems				All other payloads managed by NASA, International Partners, other agencies, or commercial owners
a) DDT&E	Payloads designated by NASA			NASA designated or competitively won via AO partnering
b) Subrack Integration	If ISSRI sustaining the facility			
c) Operations	For ops assoc with ISSRI dev Flight systems			
8. Developing Ground Systems	For Ground Systems assoc with ISSRI devFlight systems			Other ground systems managed by NASA, International Partners, other agencies, or commercial owners

ISS Research Institute (ISSRI) Option
End-State Functional Allocation

Other Functions	Lead	Remarks
0) Define, Develop and Implement Policy and Strategic Plans	NASA	Inherently Governmental
10. Constructing Ground Facilities		Proposal dependent
11. Maintaining Ground Facilities		Proposal dependent
12) Certifying Safety of Research Flight and Ground Systems	NASA	Appropriately NASA Led
13) Managing Missions and Allocating Services		
a) Advocacy, Manifesting and Resource Allocations		
b) ISS Research Mission Management	NASA	Continuous Improvement
14) Integrating User Mission – Analytical		
a) Payload Engineering Integration	NASA	Continuous Improvement
b) Payload Software Integration and Flight Production	NASA	Continuous Improvement
15. Integrating User Missions - Physical	NASA	Appropriately NASA Led
16) Integrating User Missions - Operational		
a) Payload Training	NASA	Continuous Improvement
b) Operations Integration	NASA	Continuous Improvement
17) Conducting Research & Analysis and Disseminating Results	PI	

ISS Research Institute (ISSRI) Option Interfaces



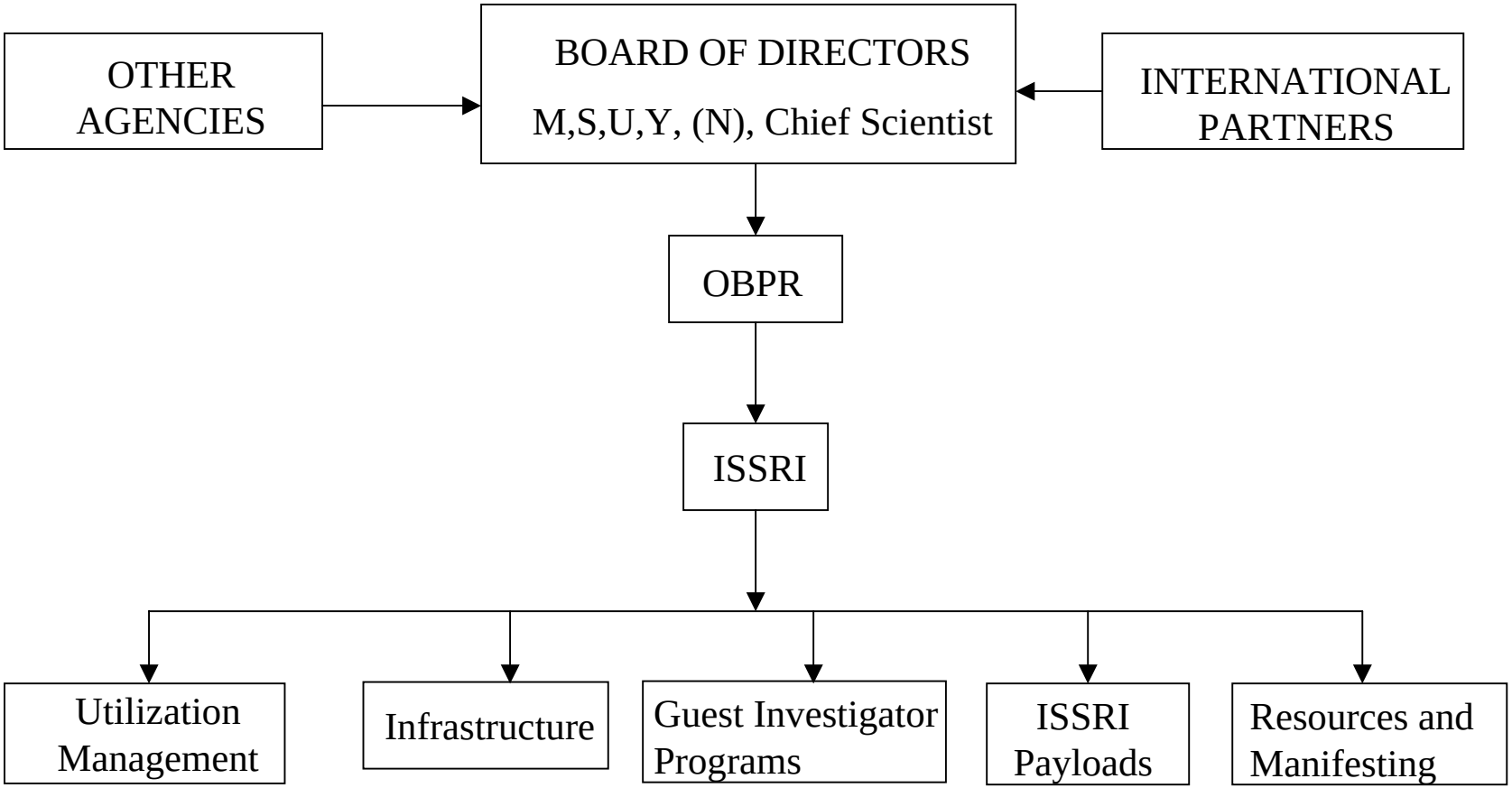
ISS Research Institute (ISSRI) Option Key Aspects

- The Institute is designed to provide leadership and advocate for science, technology, and commercial users.
- The Institute is managed by and as an independent entity affiliated with NASA, acknowledging NASA sponsorship and support.
- Strategic technical direction for the Institute is developed by a NASA Board of Directors comprised of representatives from the NASA user Enterprises and the Chief Scientist. The Institute contract is managed by the Office of Biological and Physical Research .
- The Institute fosters cooperation, not competition, among the Government, academic, and industry sectors.
- The Institute develops and manages Guest Investigator Programs.
- A competitive process that adheres to NASA's policy of independent peer review for all research initiatives is key to the Institute scientific research selection process for GI Program grants awarded by the Institute.

ISS Research Institute (ISSRI) Option
Key Aspects continued

- Institute scientists may be competitively selected to conduct research under the auspices of the Institute (principal investigators selected under NASA Research Announcements, guest investigators selected under ISSRI Research Announcements).
- Independent organizations may elect to use the Institute for selection, GI programs, payload development, and results archiving and dissemination at their discretion.

ISS Research Institute (ISSRI) Option
Management Structure



ISS Research Institute (ISSRI) Option
Functional Organization

Infrastructure

* (L) General & Administrative

2 (S) Budgets

Resources and Manifesting (L)

1c Manage Increment Schedules

13a Advocacy, Manifesting and Resource Allocations

ISSRI Payloads (proposed or assigned)

4a (L) Experiment Requirements & Feasibility

5 (S) Cost, Schedule, & Risk Assessments

6a,c (L) Experiment Development, Operations

6b (L) Subrack Integration (if ISSRI owns facility)

7 (L) Maintaining Flight Systems (ISSRI systems)

8 (L) Ground Systems Development (ISSRI sys.)

9 (L) Maintaining Ground Systems (ISSRI sys.)

Utilization Management

* (L) Focal Point for Users as Knowledgeable Experts

* (L) Promote commercial utilization & manage interfaces

1 (S) Manage Research Utilization, Boards

3 (S/L) Selection Process

18 (L) Education and Outreach

19 (S) P3I

20 (L) Managing Archive

GI Programs (L)

1b Manage Research Programs

3a Manage Selection Process

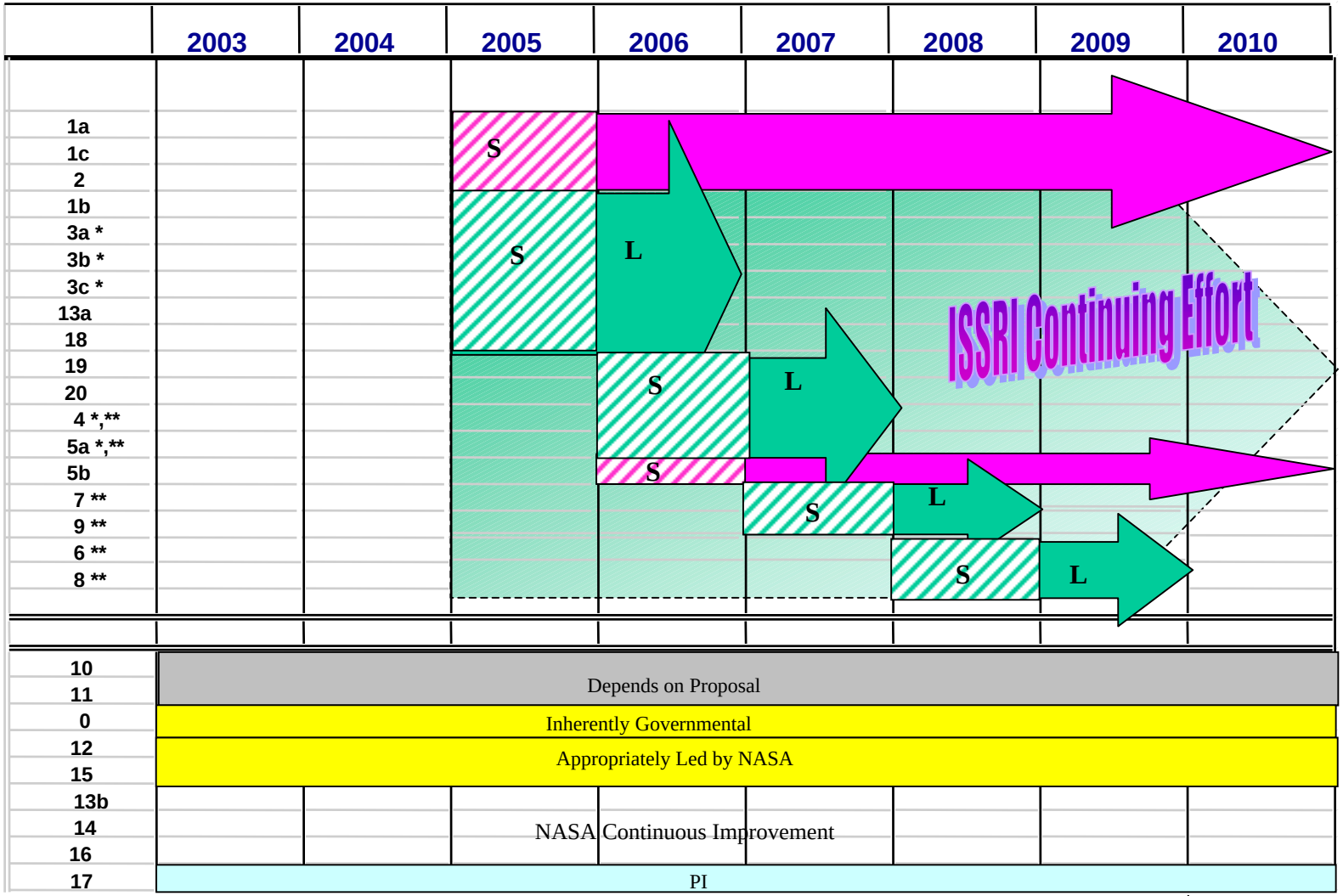
3b,c Select and Prioritize

4a Experiment Requirements & Feasibility

5a Cost, Schedule, & Risk Assessment

* New Institute specific function

ISS Research Institute (ISSRI) Option
Transition Strategy



Contract Milestones

NASA Procurement — Award

Option 1

Legend:

= Start up phase **S = Support** **L = Lead** *** = for GI programs** **** = for designated flight systems**

ISS Research Institute (ISSRI) Option
Transition Strategy

- The transition to the ISS Research Institute (ISSRI) is envisioned to be a time-phased approach across five years; anticipate that ISSRI will assume all contractual responsibilities by the end of the fifth year, or sooner, based on contractor demonstrated capabilities
- The Start-Up Phase will assign support roles to the ISSRI in the S/T/C leadership aspects of ISS utilization with selected responsibilities transitioning to Lead roles during the Transition Phase. The Start-Up Phase is proposed to last one year.
- The transition strategy requires the ISSRI to demonstrate the capability to assume the Lead role for any given function by meeting transition criteria prior to full transition of that function. During the Transition Phase, the ISSRI will sequentially assume additional Support responsibilities and, with demonstrated capabilities, assume Lead responsibilities for selected functions. The Transition Phase is assumed to last up to three years.
- The End state phase is the full up version of the ISSRI. It is expected that at the start of this phase the ISSRI has fully staffed up and demonstrated its ability to take over the full range of roles and responsibilities required to perform its function.

ISS Research Institute (ISSRI) Option
Goals Assessment

- The Institute provides the intellectual leadership and centralized focus for the utilization program demonstrating the NASA commitment to ISS as a World-Class research facility
- The Institute provides the consolidated, strong advocacy for the user community in order to effect change in the utilization systems and processes
- The Institute provides a central, knowledgeable focal point for the user community's access to ISS utilization and supports the users' interaction with the ISS organizations
- The Institute, responsible for the development, management, and total life cycle of GI programs, optimizes the use of available hardware and improves the time to flight for GI investigations
  - GI Programs have the potential to encompass a significant percentage of ISS utilization
- The Institute provides a consolidated and consistent approach for ISS education and outreach under the strategic guidance of NASA

ISS Research Institute (ISSRI) Option
Workforce Assessment

- The Institute is established in FY05 with a workforce of approximately 70.
  - Sufficient to establish a foundation for development of a viable Institute
  - The work of approximately 7 out of 589 civil service workforce transfers to the ISSRI
- By the end of FY07 the Institute grows towards a workforce of approximately 400.
  - This forecasted business growth is sufficient to attract a range of potential bidders
  - In total, the work of approximately 47 out of 557 civil service workforce transfers to the ISSRI
- Functions and budget associated with payload and ground systems development functions would not initiate transition until post FY07 (beyond scope of available data).

ISS Research Institute (ISSRI) Option
Competencies Assessment

Loss of any identified high priority competencies at the NASA Centers through function transfer to the ISSRI are mitigated by:

- The number and types of payloads developed by the Institute are limited in order to strike a balance between staffing critical competencies for both the ISSRI and NASA
- Individual payloads developed by ISSRI are strategically selected to ensure maintenance of competencies
  - NASA assigns payloads to ISSRI , or
  - ISSRI partners with proposers for development in open competitions

ISS Research Institute (ISSRI) Option
Budget Assessment

- The Institute is established in FY05 with a budget of approximately $18M.
  - Sufficient to establish a foundation for development of a viable Institute
  - Approximately $9M of NASA's Research Capability Budget and $9M additional funds for transition and infrastructure costs are allocated to the ISSRI contract
- By the end of FY07 the Institute grows towards a budget of approximately $88M.
  - This forecasted business growth is sufficient to attract a range of potential bidders
  - Approximately $55M of NASA's Research Capability Budget and $33M additional funds for transition and infrastructure costs are allocated to the ISSRI contract
- Functions and budget associated with payload and ground systems development functions would not initiate transition until post FY07 (beyond scope of available data).

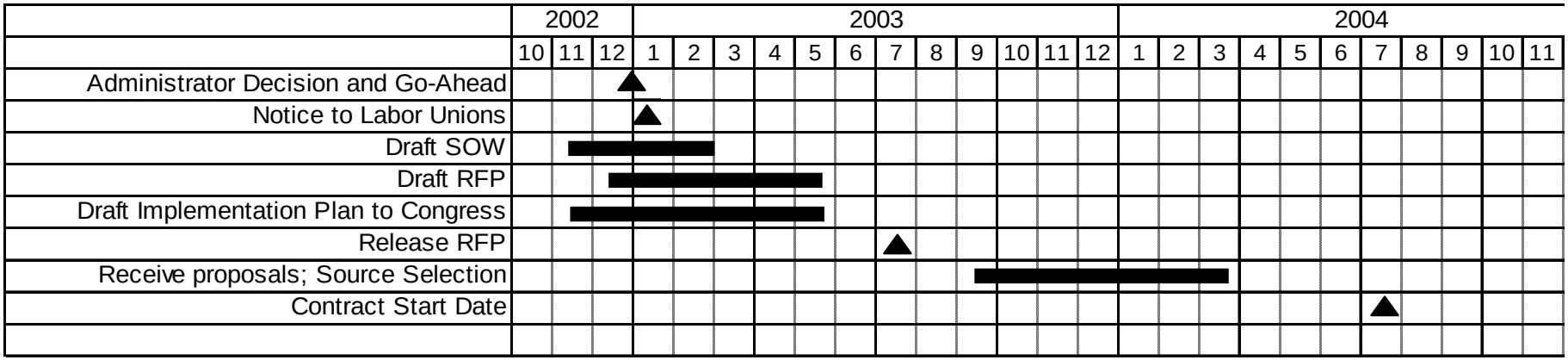
ISS Research Institute (ISSRI) Option
Distinguishing Strengths

- Provides independent leadership for, and representation of, entire S/T/C user community
- Well-established and successful precedent for NASA research institutes
- Leadership stature and ability of Institute staff to conduct research enhances the recruitment and retention of the “best and brightest”
- NASA user Enterprises retain control of strategic ISS utilization priorities and direction through the NASA Board of Directors and the Institute contract
- Maintains the balance of technical and leadership competencies between NASA and the Institute
- Minimizes impact to civil service workforce
- NASA retains control of the full utilization budget through the Institute contract
- Minimal impact to ISS vehicle, vehicle interfaces, and ongoing integrated engineering activities
- Contract allows orderly termination of Institute at end of NASA’s ISS utilization life

ISS Research Institute (ISSRI) Option
Distinguishing Weaknesses

- Difficult to provide leadership for all three communities and multiple science disciplines with one institute;
- Addition of payload development may broaden scope beyond ability of research institute and introduces potential conflicts of interest
- Responsibility for GI program selections and ability of staff to propose introduces potential for conflict of interest
- Delegating utilization manifesting to the Institute may negatively impact current efforts to consolidate and streamline shuttle and station manifesting
- Institute cannot negotiate and approve agreements directly with the International Partners

ISS Research Institute (ISSRI) Option Legislative Path



Backup Material